MULTIMEDIA UNIVERSITY®

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2015/2016

HPT2029 INTRODUCTION TO HUMAN PATHOLOGY

(All Sections / Groups)

10 MARCH 2016
9.00 a.m - 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **10** pages including cover page with **6** questions only.
2. Attempt only **FIVE** out of SIX questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the space provided in this question paper.

QUESTION 1

Most cellular injuries involve mitochondria directly or indirectly. Describe the causes, mechanisms and the consequences of mitochondrial injury. **[10 marks]**

Continued...

QUESTION 2

(a) Fill the blank in the following: **[1 mark]**

i. The phenomenon where white blood cells roll and become attached to the edge of the endothelium is called _____.

ii. Active movement of polymorphonuclear leukocytes along a concentration gradient is known as_____.

iii. The process by which the cytoplasm of the polymorphonuclear leukocyte surrounds the bacteria and encloses it into an invagination of the cell membrane is known as _____.

iv. Inflammation that lasts a long time and produces extensive tissue destruction and has a tendency to heal less readily is known as _____.

(b) State if the following statements are True or False. **[1 mark]**

Statement	True/False?
i. Inside the phagocytic vacuole, the bacterium is killed by bacteriocidal substances released from the nucleus of the polymorphonuclear leukocytes	
ii. Histamine and leukotriene are mediators that increase vascular permeability	
iii. A critical function of the vascular inflammatory response is to deliver monocytes to the site of injury in order to clear injurious agents	
iv. Defective inflammation increases susceptibility to infection	

(c) Inflammation is part of the complex biological response of vascular tissues to harmful stimuli such as pathogens, damaged cells, or irritants.

i. What are the first 4 cardinal signs of the inflammatory response? **[1 mark]**

_____

_____

_____

_____

Continued...

ii. Explain in detail the mechanism that leads to each of these cardinal signs. **[2 marks]**

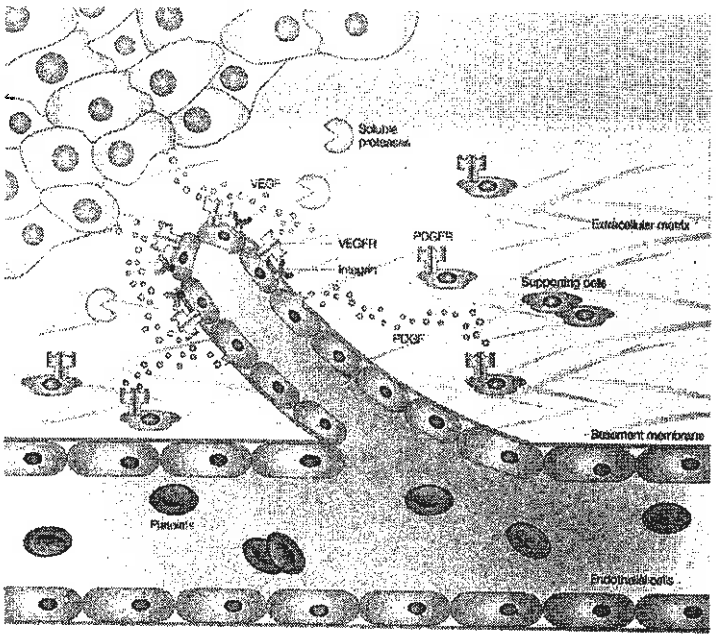
(d) The mechanisms that function to eliminate microbes and dead cells (the physiologic role of inflammation) are also capable of damaging normal tissues. Explain how this could happen. **[3 marks]**

(e) Give TWO examples of diseases which can be caused leukocyte-induced tissue injury, following an acute inflammation and TWO examples following a chronic inflammation. **[2 marks]**

Continued...

QUESTION 3

(a) The figure below shows the major steps in angiogenesis from preexisting vessels after an injury:



Nature Reviews | Drug Discovery

Put the following sentences in the correct order to describe the series of events that take place during angiogenesis. (no need to rewrite the sentences, answer by using the number of each paragraph).

(1) The endothelial cells deposit a new basement membrane and secrete growth factors, such as platelet-derived growth factor (PDGF), which attract supporting cells to stabilize the new vessel. PDGFR-PDGF receptor; VEGFR-VEGF receptor.

(2) Interactions between endothelial cells and cells at the site of injury, lead to the secretion and activation of various proteolytic enzymes, such as matrix metalloproteinases (MMPs), which degrade the basement membrane and the extracellular matrix.

(3) Cells in the site of injury release pro-angiogenic factors, such as vascular endothelial growth factor (VEGF), which diffuse into nearby tissues and bind to receptors on the endothelial cells of pre-existing blood vessels, leading to their activation.

(4) Degradation allows activated endothelial cells - which are stimulated to proliferate by growth factors - to migrate. Integrin molecules help to pull the sprouting new blood vessel forward.

The correct order is: _____ **[2 marks]**

Continued...

(b) i. Name the TWO processes of wound healing, depending on the type of wound. **[1 mark]**

ii. What are the differences between them? **[2 marks]**

(c) Match the following: **[3 marks]**

i. Scurvy ( )	A. deficiency of proteins
ii. Marasmus ( )	B. deficiency of energy (calories)
iii. Kwashiorkor ( )	C. deficiency of vitamin C
iv. Impaired vision ( )	D. deficiency of vitamin B_1
v. Beri-beri ( )	E. deficiency of vitamin A
vi. Minamata disease ( )	F. mercury poisoning

(d) Complete the table below: **[2 marks]**

	Nondisjunction in oocyte (Yes/No)	Nondisjunction in sperm (Yes/No)
XO		
XXX		
XXY		
XYY		
YO		

Continued...

QUESTION 4

(a) What is a deep vein thrombosis? **[1 mark]**

(b) What is a pulmonary embolism? **[1 mark]**

(c) Briefly describe the THREE factors, as postulated in Virchow's triad, which contribute to thrombosis? **[6 marks]**

(d) Name FOUR risk factors for thrombosis. **[2 marks]**

Continued...

QUESTION 5

(a) What is the difference between inherited and sporadic cancer? **[3 marks]**

(b) Why are mutations that affect tumor suppressor genes considered recessive acting? **[1 mark]**

(c) A woman has a type of colon cancer that is caused by the loss of the APC tumor suppressor gene. Her brother, father, and grandmother also had this type of colon cancer.

i. What is the most likely genotype of most cells in her body in regards to the APC gene? Explain your answer. **[1 mark]**

ii. What is the most likely genotype of the colon cancer cells in regards to the APC gene? Explain your answer. **[1 mark]**

Continued...

iii. Cancer often arises in tissue as a result of genetic mutation in the once normal cell. Name the major gene groups that may be modified during cancer initiation. Give ONE example for each, and describe how the modifications of these genes lead to cancer formation. **[4 marks]**

Continued...

QUESTION 6

(a) Systemic lupus erythematosus (SLE) is a chronic, multifaceted inflammatory disease that can affect every organ system of the body. Discuss the pathophysiology, causes, and clinical manifestations of the disease. **[8 marks]**

(b) Name FOUR other examples of autoimmune disorders. **[2 marks]**

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